REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-15 are pending in this case. Claim 3 is amended by the present amendment. Claims 1, 2, 4, and 6-15 are withdrawn. Amended Claim 3 is supported by Figure 2A, and therefore adds no new matter.

In the outstanding Official Action, Claims 3 and 5 are rejected under 35 U.S.C. §103(a) as unpatentable over Sittig (U.S. Patent No. 4,377,816). Claims 3 and 5 are also rejected under 35 U.S.C. §103(a) as unpatentable over Watanabe et al. (U.S. Patent No. 5,710,442, hereinafter "Watanabe").

Applicants and Applicants' representatives thank Examiner Jackson for the courtesy of the interview granted to Applicants' representatives on January 26, 2005. During the interview, the definition of D1 in Claim 3 was discussed. Examiner Jackson noted that this definition needs to be clarified. Further, differences between the Claim 3 and the cited references were discussed. Examiner Jackson agreed that Claim 3 overcame the rejections of record.

The specification is amended to make the specification consistent with the amendment to Claim 3. The amendments to the specification are also supported by Figure 2A. Accordingly, no new matter is added.

The rejections are respectfully traversed.

The present inventors discovered that the reverse recovery and reverse-blocking withstand voltage characteristics of a semiconductor device having first, second, third, and fourth diffusion layers could be improved by constructing the device such that a depth of the first diffusion layer from the first side of the semiconductor substrate is greater than a depth of the second diffusion layer from the second side of the semiconductor substrate, and the

depth of the second diffusion layer is greater than the depth of the third diffusion layer from the second side of the semiconductor substrate.

Accordingly, amended Claim 3 recites a pressed-contact type semiconductor device:

> ...
> wherein a depth D1 of the first diffusion layer from the first side of the semiconductor substrate, a depth D2 of the second diffusion layer from the second side of the semiconductor substrate and a depth D3 of the third diffusion layer from the second side of the semiconductor substrate have a relation of D1 > D2 > D3.

In contrast, Sittig describes a semiconductor element including a cathode zone 15, an anode zone 16, a P basis zone 17, and a guard ring 18.[1] Page 2 of the outstanding Office Action cited P basis zone 17 as a first diffusion layer, guard ring 18 as a second diffusion layer, anode zone 16 as a third diffusion layer, and cathode zone 15 as a fourth diffusion layer. The outstanding Office Action further stated that the thicknesses of the first and second diffusion layers are equal, based on the thickness of the P basis zone in the area of the peripheral surface ($d'_B = 130\ \mu m$). The outstanding Office Action concluded that the difference between the alleged D1 = D2 and the alleged D1 > D2 is not patentable as a slight depth difference "should be considered obvious process tolerance."

However, the thickness of the P basis zone in the area of the cathode zone ($d_B = 50\ \mu m$) is less than the thickness of the guard ring 18 ($d_G = 130\ \mu m$). It is respectfully submitted that the thickness of the P basis zone is the appropriate thickness to analyze, as this is the minimum thickness across the surface of the device and is the thickness that affects the characteristics of the device. In fact, Sittig teaches that the thickness of the P basis zone in the electrically active area (the area in the cathode zone) is the thickness that affects the triggering and passage characteristics.[2] Since the thickness of the P basis zone in the area of the cathode zone is less than the thickness of the guard ring, it is respectfully submitted that

[1]See Sittig, column 4, lines 1-21 and Figure 8.
[2]See Sittig, column 4, lines 22-25.

Sittig does not teach or suggest that "a depth D1 of the first diffusion layer ..., a depth D2 of the second diffusion layer ... and a depth D3 of the third diffusion layer ...have a relation of D1 > D2 > D3," as recited in Claim 3.

Further, Sittig explicitly teaches against the claimed invention. A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). See MPEP §2141.02. As discussed above, column 4, lines 22-25 of Sittig state "The P basis zone 17 in the electrically active area is selected to be thinner than in previous thyristors which contributes to better triggering and passage characteristics." Thus, the teaching in Sittig to thin the P basis zone 17 to improve triggering and passage characteristics is directly contrary to the teaching by the present inventors to thicken a first and fourth diffusion layer to improve reverse recovery and reverse-blocking withstand voltage characteristics. Accordingly, it is respectfully submitted that there is no suggestion or motivation to modify the device of Sittig directly contrary to the teachings of Sittig.

In addition, if proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). See MPEP §2143.01. Since the proposed modification of thickening the P basis zone of Sittig would worsen triggering and passage characteristics of the modified device, contrary to the teachings of Sittig, it is respectfully submitted that there is no suggestion or motivation to make the proposed modification.

Accordingly, since Sittig does not teach or suggest each and every element of Claim 3, Sittig teaches directly contrary to the invention recited in Claim 3, and the proposed

modification of the Sittig apparatus would make the proposed apparatus unsatisfactory for its intended purpose, it is respectfully submitted that Claim 3 is patentable over Sittig.

Watanabe describes a semiconductor device including an n-type semiconductor layer 4 connected to a cathode 7, a p-type semiconductor layer 3, an n-type semiconductor layer 1, a p-type semiconductor layer 300, and a p-type semiconductor layer 50 connected to an anode 5.[3] Page 3 of the outstanding Office Action cited layer 1 as a substrate, layer 3 as a first diffusion layer, layer 300 as a second diffusion layer, layer 50 as a third diffusion layer, and layer 4 as a fourth diffusion layer. The Office Action further stated that the depth of layer 3 is greater than layer 300, and the depth of layer 300 is greater than the depth of layer 50, apparently based on the scale of the figures. However, it is respectfully submitted that there is no teaching or suggestion in Watanabe that "a depth D1 of the first diffusion layer ..., a depth D2 of the second diffusion layer ... and a depth D3 of the third diffusion layer ...have a relation of D1 > D2 > D3," as recited in Claim 3.

As discussed in MPEP §2125, proportions of features in a drawing are not evidence of actual proportions when the drawings are not to scale. When a reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value. See *Hockerson-Halberstadt, Inc. v. Avia Group Int'l*, 222 F.3d 951, 956, 55 USPQ2d 1487, 1491 (Fed. Cir. 2000) (The disclosure gave no indication that the drawings were drawn to scale. "[I]t is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue.").

In the present case, Watanabe gives no indication that the drawings are drawn to scale. Although the thicknesses of some of the layers are provided in the description (i.e.

[3]See Watanabe, Figure 1.

layer 50 is 10 μm),[4] it is respectfully submitted that the thicknesses of each layer are not provided, and thus there is no teaching or suggestion in Watanabe that "a depth D1 of the first diffusion layer ..., a depth D2 of the second diffusion layer ... and a depth D3 of the third diffusion layer ...have a relation of D1 > D2 > D3," as recited in Claim 3.

Since Watanabe does not teach or suggest each and every element of Claim 3, Claim 3 is patentable over Watanabe.

Claim 5 is dependent from Claim 3, which applicants believe is patentable for the above stated reasons. Accordingly, Claim 5 is also believed to be patentable at least for the reasons discussed above with respect to Claim 3.

Accordingly, the outstanding rejections are traversed and the pending claims are believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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[4]See Watanabe, column 6, line 50 to column 7, line 41.